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Nobel Laureate Michael Morris Rosbash : A scientometric portrait

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ABSTARCT

Present Study analysis 201 publications (1972-2008) of Nobel laureate Jeffrey C Hall, an American eminent scientist in geneticist. His publications received 18,896 citations and first paper was reported in Scopus in 1972, subsequently, he published 200 research papers in various journals. The collaboration coefficient of scientist is 0.89 and forty-three (43) are two authored publications, 22 are single authored, scientist has authored highest publication in decade III (1990-1999) with 81(40.30%) publications. The paper entitled "A pdf neuropeptide gene mutation and ablation of PDF neurons each cause severe abnormalities of behavioral circadian rhythms in Drosophila" published in 'Cell' journal in 2000 has been cited highest 632 times with ranked 1 among all his publications. Study reveals out of 201 publications 193 (96.02%) papers are obtained all 18896 citations, and top 20(9.95%) publications are obtained 7566(40.04%) citations, and cited more than 200 times, scientist preferred 50 channel of

communications are used to publish his research output, most publications 28(13.93%) were published in 'Genetics' (IF: 4.556) journal.

Keywords: Scientometric, Jeffrey C Hall, Bibliometric, Scopus, Citation.

INTRODUCTION

Individual scientists including the Nobel laureates are more and more becoming the focus of scientometric studies for quite some time.(Kalyane, V. L.; Sen, 1996), a good number of scientometric studies have been carried out on individual scientists from diverse subject backgrounds and disciplines. Scientometric analysis have been carried out on Nobel Laureates in various fields physics scientist, chemical scientist, chemist, agriculture scientist, nuclear scientist and so on (Kalyane and Kalyane, 1993; Gadad and Ravi, 2016; Hazarika, Sharma and Sen, 2010; Munnolli, Pujar and Kademani, 2011; Shinha, 2017; Kalyane and Kalyane, 1994; Konganurmath, Angadi and Kademani, 2004; Angadi et al., 2006; Kademani, Kalyane and Kumar, 2002; Vellaichamy and Amsan, 2016; Kademani, Sagar and Kumar, 2009; Dixit and Jange, 2017).

Scientometrics is concerned with the quantitative features and characteristics of science and scientific research. The term had gained wide recognition by the foundation in 1978 of the journal Scientometrics by Tibor Braun in Hungary and currently from Amsterdam. According to its subtitle, Scientometrics includes all quantitative aspects of the science of science, communication in science, and science policy (Wilson, 2001).

Bio-bibliometrics is a term that was first coined by Sen and Gan (1990) to mean the quantitative and analytical method for discovering and establishing functional relationships between bio-data and biblio-data elements. Bio-bibliometric is a study in which we statistically analyze publications of an individual, a department, or a subject of any field. It is a quantitative and analytical method in which we try to establish a functional relation between bio-data of an individual and his biblio-data. Mathematical and statistical techniques are used to study a publication's pattern, preferences, author's collaboration and chronological distribution of publications (Qayyum & Naseer, 2013). Kalyane and Kalyane (1993) first used the phrase 'Scientometric Portrait' to carry out bio-bibliometric studies on scientists. The present study centres on the contributions Jeffrey C. Hall, an American scientist, who won the Nobel Prize 2017 for Medicine for their discoveries of "molecular mechanisms controlling the circadian rhythms.

BIOGRAPHICAL SKETCH

Jeffrey C. Hall, (born May 3, 1945, Brooklyn, New York) is well known American geneticist for his investigations of courtship behaviour and biological rhythms in the fruit fly *Drosophila melanogaster*. His research into molecular mechanisms underlying biological rhythm in the fruit fly helped scientists gain new insight into circadian rhythm, the self-regulating 24-hour biological clock that drives daily behavioral patterns in humans and other animals. For his research, he was awarded with the Nobel Prize in Physiology or Medicine in 2017 (shared with American scientists Michael Rosbash and Michael W. Young).

Hall grew up in Washington, D.C. He attended Amherst College in Massachusetts with studying medicine. Hall studied genetics at the University of Washington in Seattle, where he received Ph.D. in 1971. He subsequently pursued his postdoctoral research at the California Institute of Technology (CIT). In 1974 Hall became an assistant professor of biology at Brandeis University in Waltham, Massachusetts.

In 2004, after being named Emeritus Professor of Biology at Brandeis, Hall joined University of Maine as an associate professor, later he became Libra Professor of Neurogenetics. In addition to the Nobel Prize, Hall was awarded with various awards and honours during his career, including the Gruber Prize in Neuroscience (2009) and the Canada Gairdner International Award (2012), both are shared with Rosbash and Young.

SCOPE OF THE STUDY

The study is covered the Jeffrey C. Hall's 201 publications (1972-2008) and citations received (1972-2017).

OBJECTIVES OF THE STUDY

The main objectives of the study are:

- To find out the year-wise and age-wise distribution of authorship pattern;
- Decade-Wise Distribution of Publication of Jeffrey C. Hall;
- To know the most citied papers;
- To know the year-wise citations;
- To find out the Journals preferred by Jeffrey C. Hall; and
- To identify the prominent authors.

METHODOLOGY

To conduct the study Scopus database was used to retrieve research output Jeffrey C. Hall. A total of 201 paper published by Jeffrey C. Hall during 1972-2017.The data obtained for study

from Scopus database on November 10, 2017 and then transferred into spread sheet application and analysed as per objectives of the study.

RESULTS AND DISCUSSION

YEAR-WISE AND AGE-WISE PUBLICATION PRODUCTIVITY OF JEFFREY C. HALL.

Jeffery C. Hall's first paper was reported in 1972 at the age of 27 in *Genetics*.He subsequently published 200 papers in various journals during 1973-2017.Categories of his publications published includes 166 Journal articles (82.6%), 16 Reviews (8.0%), 7 Erratum (3.5%), 4 Conference papers (2.0%), 4 Short Survey (2.0%), 2 Notes (1.0%), 1 Editorial (0.5%) and 1 Letter (0.5%). Table 1 indicates authorship pattern; it reveals highest number of literature is written by two authored 43(21.39%), followed by three authored and five authored 34(16.91%). Table 1 also indicate that scientist has published 22 single authored and 179 multi-authored papers. At biological age of scientist 46 and 55 his publications productivity was on peak (14) and the Collaboration Coefficient is 0.89.

Table: 1 Year-wise and age-wise publication productivity of Jeffrey C. Hall between 1972-2017

Age of JCH	Year	Number of Papers under different Authorships													CT	CC	PPA
		1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	17A	MA	TP			
27	1972	1	-	-	-	-	-	-	-	-	-	-	1	1	2	2	0.50	1
28	1973	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
29	1974	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
30	1975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
31	1976	-	2	-	-	-	-	-	-	-	-	-	-	2	2	4	1.00	5
32	1977	1	-	-	-	-	-	-	-	-	-	-	-	-	1	5	0.00	6
33	1978	2	-	-	-	-	-	-	-	-	-	-	-	-	2	7	0.00	7
34	1979	1	3	-	-	-	-	-	-	-	-	-	-	3	4	11	0.75	8
35	1980	-	1	2	1	-	1	-	-	-	-	-	-	5	5	16	1.00	9
36	1981	-	2	-	-	-	-	-	-	-	-	-	-	2	2	18	1.00	10
37	1982	1	1	-	-	1	-	-	-	-	-	-	-	2	3	21	0.66	11
38	1983	1	1	-	1	-	-	-	-	-	-	-	-	2	3	24	0.66	12
39	1984	-	3	-	2	-	-	2	-	-	-	-	-	7	7	31	1.00	13
40	1985	-	2	1	-	-	-	-	-	-	-	-	-	3	3	34	1.00	14
41	1986	1	1	1	-	1	-	-	-	-	1	-	-	4	5	39	0.80	15
42	1987	-	6	1	-	2	1	1	-	-	-	-	-	11	11	50	1.00	16
43	1988	-	2	5	-	2	-	-	-	-	-	-	-	9	9	59	1.00	17
44	1989	-	3	3	2	1	-	1	-	-	-	-	-	10	10	69	1.00	18
45	1990	1	2	2	3	-	1	-	-	-	-	-	-	8	9	78	0.89	19
46	1991	1	-	1	1	1	1	1	-	-	-	-	-	5	6	84	0.83	20
47	1992	-	1	5	1	6	1	-	-	-	-	-	-	14	14	98	1.00	21
48	1993	-	1	1	1	1	-	-	-	-	-	-	-	4	4	102	1.00	22
49	1994	1	1	-	1	4	-	-	-	-	-	-	-	6	7	109	0.86	23
50	1995	1	1	-	-	-	-	-	-	-	-	-	-	1	2	111	0.50	24
51	1996	1	2	1	-	3	2	1	1	1	-	-	-	11	12	123	0.92	25
52	1997	1	-	2	3	1	2	-	1	-	-	1	-	10	11	134	0.91	26
53	1998	2	3	1	1	4	1	-	1	-	-	-	-	11	13	147	0.84	27
54	1999	-	1	-	-	1	-	-	1	-	-	-	-	3	3	150	1.00	28
55	2000	1	2	3	2	2	3	1	-	-	-	-	-	13	14	164	0.93	29

56	2001	-	1	1	3	1	-	-	1	-	-	1	-	8	8	172	1.00	30
57	2002	1	-	1	7	-	-	1	-	-	-	-	-	9	10	182	0.90	31
58	2003	2	-	1	-	2	-	-	-	-	-	-	-	3	5	187	0.60	32
59	2004	-	-	-	1	-	-	-	-	-	-	-	-	1	1	188	1.00	33
60	2005	1	-	-	2	-	1	-	-	-	-	-	-	3	4	192	0.75	34
61	2006	-	-	-	1	-	-	-	2	-	-	-	-	3	3	195	1.00	35
62	2007	1	-	2	-	-	1	-	-	-	-	-	-	3	4	199	0.75	36
63	2008	-	1	-	-	1	-	-	-	-	-	-	-	2	2	201	1.00	37
64	2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38
65	2010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39
66	2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
67	2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41
68	2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42
69	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43
70	2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44
71	2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45
72	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46
Total		**22**	**43**	**34**	**33**	**34**	**15**	**8**	**7**	**1**	**1**	**2**	**1**	**179**	**201**		**0.89**	
Percentage		**10.95**												**89.05**	**100**			

Note: 1A= One Author, (2A-17A= Multiple Author (MA)), TP= Total Publication, CT= Cumulative Total, CC= Collaboration Coefficient, PPA= Publication Productivity Age

DECADE-WISE DISTRIBUTION OF PUBLICATION OF JEFFREY C. HALL

Table 1a. Indicates decade-wise distribution of publication of scientist, the maximum number of publications of scientist were published in decades III (1990-1999), followed by decades II (1980-1989) and IV (2000-2009). He published very less papers in decades I (1980s).

Table.1a: Decade-wise Distribution of Publication of Jeffrey C. Hall

Decade	Decade Period	No. of Publications	Percentage	Cumulative total	Publishing Career Age (Year: 1972)	Biological Age (DOB: 1945)
I	1970-1979	11	5.47	11	1-9	27-36
II	1980-1989	58	28.85	69	10-19	37-46
III	1990-1999	81	40.30	150	20-29	47-56
IV	2000-2009	51	25.37	201	30-39	57-66
V	2010-2017	0*	0	201	40-49	67-72

* There was no publication published during decade V (2010-2017)

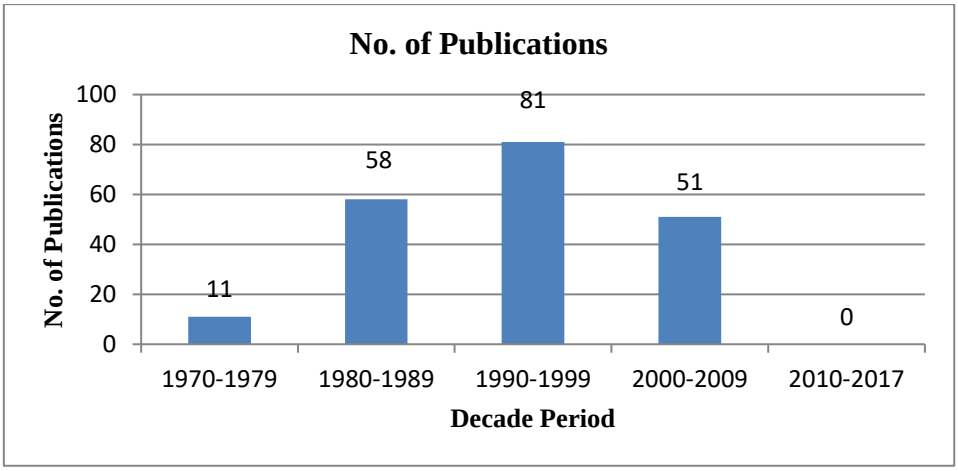

Fig .1 Decade-wise Distribution of Publication of Jeffrey C. Hall

Figure 1 revealed highest number of publications 81(40.30%) of J. C. Hall were published in Decade III (1990-1999) and no paper was published after decade IV (2000-2009), scientist last paper was published in 2008 (indicated in Table 1) at age 63, it might be age factor to decline in productivity of publication.

HIGHLY CITED PAPER OF JEFFREY C. HALL

Table 2 shows twenty highly cited publications of Jeffrey C Hall which have received more than 200 citations during the period 1988-2008. The paper entitled "*A pdf neurpeptide gene mutation and ablation of PDF neurons each cause severe abnormalities of behavioral circadian rhythms in Drosophila"* published in *'Cell'* journal in 1999 has received 632 citations with ranked one (1) among all his publications, followed by "*The cry(b) mutation identifies cryptochrome as a circadian photoreceptor in Drosophila" published* in *'Cell'* Journal in 1998 has received 623 citations with ranked two(2). Study also focused majority of highly cited 6 papers have published in 'Cell' journal which citation and ranks are simultaneously 632 (Rank 1), 623 (Rank 2), 513 (Rank 4), 467 (Rank 6), 413 (Rank 8), 307 (Rank 11).

Table 2. Top 20 highly Cited paper of Jeffrey C. Hall

Sl. No	**Title of the Papers**	**Year of Publication**	**Journal Name**	**No of Citations**	**Rank**
1	A pdf neuropeptide gene mutation and ablation of PDF neurons each cause severe abnormalities of behavioral circadian rhythms in Drosophila	1999	Cell	632	1
2	The cry(b) mutation identifies cryptochrome as a circadian photoreceptor in Drosophila	1998	Cell	623	2
3	Feedback of the Drosophila period gene product on circadian cycling of its messenger RNA levels	1990	Nature	621	3
4	Cry, a Drosophila clock and light-regulated cryptochrome, is a major contributor to circadian rhythm resetting and photosensitivity	1998	Cell	513	4
5	Independent photoreceptive circadian clocks throughout Drosophila	1997	Science	476	5

6	A mutant Drosophila homolog of mammalian clock disrupts circadian rhythms and transcription of period and timeless	1998	Cell	467	6
7	The mating of a fly	1994	Science	446	7
8	Cycle is a second bHLH-PAS clock protein essential for circadian rhythmicity and transcription of Drosophila period and timeless	1998	Cell	413	8
9	Segmental aneuploidy and the genetic gross structure of the Drosophila genome.	1972	Genetics	369	9
10	Differential regulation of circadian pacemaker output by separate clock genes in Drosophila	2000	Proc. Natl. Acad. Sci. U.S.A.	352	10
11	Control of male sexual behavior and sexual orientation in Drosophila by the fruitless gene	1996	Cell	307	11
12	Conditioned responses in courtship behavior of normal and mutant Drosophila	1979	Proc. Natl. Acad. Sci. U.S.A.	302	12
13	Circadian fluctuations of period protein immunoreactivity in the CNS and the visual system of drosophila	1990	Journal of Neuroscience	293	13
14	Neuroanatomy of cells expressing clock genes in Drosophila: Transgenic manipulation of the period and timeless genes to mark the perikarya of circadian pacemaker neurons and their projections	2000	Journal of Comparative Neurology	273	14
15	Drosophila CRY is a deep brain circadian photoreceptor	2000	Neuron	255	15
16	Quantitative Analysis of Drosophila period Gene Transcription in Living Animals	1997	Journal of Biological Rhythms	252	16
17	Circadian rhythm mutations in Drosophila melanogaster affect short-term fluctuations in the male's courtship song	1980	Proc. Natl. Acad. Sci. U.S.A.	246	17
18	Expression of the period clock gene within different cell types in the brain of Drosophila adults and mosaic analysis of these cells influence on circadian behavioral rhythms	1992	Journal of Neuroscience	245	18
19	The circadian clock of fruit flies is blind after elimination of all known photoreceptors	2001	Neuron	244	19
20	Antibodies to the period gene product of drosophila reveal diverse tissue distribution and rhythmic changes in the visual system	1988	Neuron	237	20

YEAR-WISE CITATION OF JEFFREY C. HALL'S PAPERS

Table 2a described year-wise citations of publications of Jeffrey C. Hall. The table indicates in 1972 he had not received any citation; author became citable in 1973 with eight (8) citations. The maximum number of citation 1026 has received in 2002 and total number of citation 18896 received till November 10, 2017.

Table 2a: Year-wise Citation of Jeffrey C. Hall's Papers

S. No	Years	Citations	Cumulative Citations
1	1972	0	0
2	1973	8	8
3	1974	6	14
4	1975	4	18
5	1976	12	30
6	1977	20	50
7	1978	31	81
8	1979	26	107
9	1980	49	156
10	1981	55	211
11	1982	59	270
12	1983	68	338
13	1984	105	443
14	1985	105	548
15	1986	112	660
16	1987	149	809
17	1988	129	938
18	1989	306	1244
19	1990	256	1500
20	1991	171	1671
21	1992	213	1884
22	1993	198	2082
23	1994	418	2500
24	1995	332	2832
25	1996	491	3323
26	1997	564	3887
27	1998	794	4681
28	1999	677	5358
29	2000	860	6218
30	2001	894	7112
31	2002	1026	8138
32	2003	955	9093
33	2004	663	9756
34	2005	969	10725

35	2006	741	11466
36	2007	918	12384
37	2008	861	13245
38	2009	742	13987
39	2010	644	14631
40	2011	676	15307
41	2012	731	16038
42	2013	748	16786
43	2014	653	17439
44	2015	512	17951
45	2016	479	18430
46	2017	466	18896

Fig .2 shown that the highest number of citations 1026 received in the year 2002.

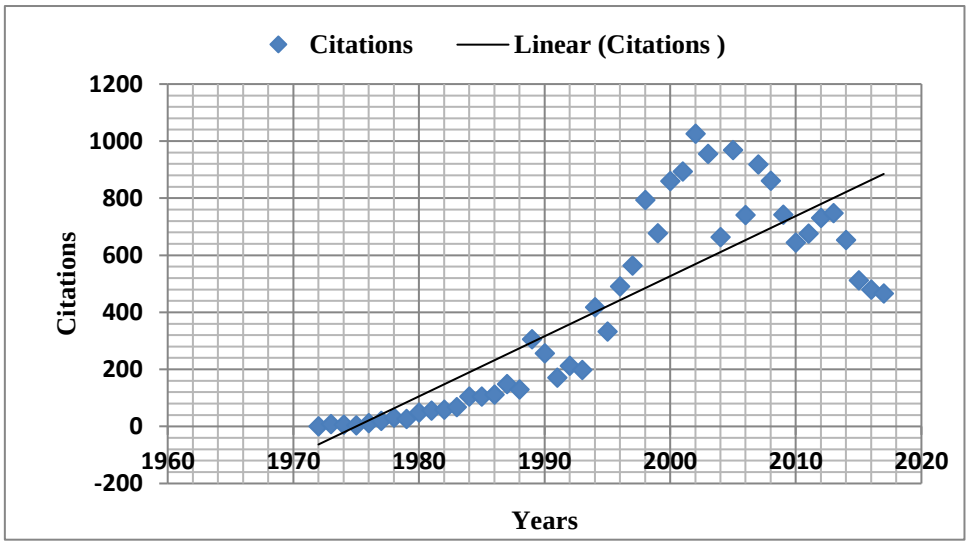

Fig .2 Year Wise Distribution of Publication Citations

Figure 2 shows Jeffrey C. Hall has received maximum 1026 citations in 2002, scientist has received total 18896 citations till date November 10, 2017.

JOURNALS PREFERRED BY JEFFREY C. HALL

Table 2b indicate that Jeffrey C. Hall has been published 201 papers so far under fifty(50) renowned Journals in the field of sciences. He has published maximum 28 papers (rank 1) in genetics (with 4.556 IF) has received 1936 citation and its average citations of paper is 69.14 during FPY-LFY 1972-2007 followed by 18 papers (rank 2) in Journal of Neurogenetics (2.291 IF), 15 papers (rank 3) in Behavior Genetics (with 2.385 IF), 12 papers (rank 4) in Cell (with 30.41 IF), 11 papers (rank 5) in Journal of Biological Rhythms (with 3.5 IF), 11 papers (rank 5) in Journal of Journal of Neuroscience (with 5.988 IF), 11 papers (rank 5) in Neuron (with 14.024 IF), 11 papers (rank 5) in Proc. Natl. Acad. Sci. U.S.A. (with 9.661 IF), 9 papers (rank

6) in Nature. (With 40.137 IF), and so on, according to table 2b, 12 publication published in 'Cell' journal has received highest 3420 citations and its average citation of paper is 285, while highest impact factor journal preferred by Jeffrey C. Hall was Nature (IF 40.137).

Table.2b: Journals Preferred by Jeffrey C. Hallfor Publication and Citations in These Journals

S.No	Source	IF	No. of Papers	Rank	No. of Citations	Average Citations	FPY-LFY
1	Genetics	4.556	28	1	1936	69.14	1972-2007
2	Journal Of Neurogenetics	2.291	18	2	607	33.72	1984-2008
3	Behavior Genetics	2.385	15	3	824	54.93	1977-2000
4	Cell	30.41	12	4	3420	285	1984-2001
5	Journal Of Biological Rhythms	3.5	11	5	971	88.27	1987-2002
6	Journal Of Neuroscience	5.988	11	5	1288	117.09	1987-2001
7	Neuron	14.024	11	5	1442	131.09	1988-2001
8	Proc. Natl. Acad. Sci. U.S.A.*	9.661	11	5	1262	114.73	1979-2006
9	Nature	40.137	9	6	1552	172.44	1984-2005
10	EMBO Journal	9.792	5	7	391	78.2	1986-1997
11	Science	37.205	5	7	1327	265.4	1986-2002
12	Advances In Genetics	5.431	4	8	333	83.25	1994-2008
13	Animal Behaviour	2.869	4	8	234	58.5	1982-1989
14	Current Biology	8.851	4	8	258	64.5	1991-2004
15	Journal Of Neurobiology		4	8	302	75.5	2000-2001
16	Current Opinion In Neurobiology	6.133	3	9	81	27	1998-2000
17	Journal Of Comparative Neurology	3.266	3	9	432	144	1980-2005
18	Journal Of Insect Behavior	0.970	3	9	175	58.33	1992-1994
19	Annual Review Of Genetics	8.745	2	10	125	62.5	1979-1990
20	BMC Neuroscience	2.312	2	10	116	58	2002-2002
21	BMC Neuroscience Electronic Resource		2	10	153	76.5	2002-2002
22	Development	5.843	2	10	107	53.5	1989-1991
23	Developmental Genetics		2	10	119	59.5	1983-1994
24	Journal Of Insect Physiology	2.227	2	10	260	130	1980-1981
25	Journal Of Molecular Evolution	2.434	2	10	26	13	1992-1993
26	Trends In Neurosciences	11.124	2	10	235	117.5	1986-1995
27	Advances In Insect Physiology	NA	1	11	54	54	1990-1990
28	Annual Review Of Neuroscience	15.63	1	11	40	40	1988-1988
29	Basic Life Sciences		1	11	13	13	1980-1980
30	Biochemical Society Transactions	2.765	1	11	1	1	1991-1991
31	Bioessays	4.441	1	11	4	4	1987-1987
32	Biological Cybernetics	1.716	1	11	8	8	1992-1992
33	Cell And Tissue Research	2.787	1	11	32	32	1996-1996
34	Cold Spring Harbor Symposia On Quantitative Biology		1	11	4	4	2007-2007
35	Developmental Biology	2.944	1	11	86	86	1976-1976
36	Discussions In Neuroscience		1	11	8	8	1992-1992
37	Gene	3.6	1	11	97	97	1996-1996
38	Genes and Development	9.413	1	11	104	104	1988-1988
39	Integrative And Comparative Biology	2.382	1	11	1	1	1992-1992

40	Journal Of Comparative Physiology A	0	1	11	0	0	1979-1979
41	Journal Of Comparative Physiology A Neuroethology Sensory Neural And Behavioral Physiology	2.492	1	11	14	14	2006-2006
42	Journal Of Membrane Biology	1.696	1	11	5	5	1993-1993
43	Learning Memory Cold Spring Harbor N Y			11	16	16	1995-1995
44	Methods In Enzymology		1	11	42	42	2005-2005
45	Plos Biology	9.797	1	11	167	167	2003-2003
46	Quarterly Reviews Of Biophysics	5.267	1	11	125	125	1982-1982
47	Results And Problems In Cell Differentiation		1	11	21	21	1978-1978
48	Trends In Ecology And Evolution		1	11	3	3	1990-1990
49	Trends In Genetics	10.844	1	11	23	23	1987-1987
50	Zeitschrift Fur Naturforschung Section C Journal Of Biosciences	1.432	1	11	25	25	1981-1981
			201				

*Proceeding of the National Academic of Sciences of the United States of America

PROMINENT AUTHORS JEFFREY C. HALL'S PUBLICATIONS ≥ 6 TIMES

Table 3 represents research team of Jeffrey C. Hall. Scientist has worked with 179 collaborators in his productive career and produced as many as 58 papers in collaboration with M. Rosbash who is found to be the most productive collaborator of Jeffrey C. Hall. There are about a ½ dozen other collaborators with whom he has produced more than10 papers.

Table: 3 - Prominent Authors Jeffrey C. Hall's Publications ≥ 6 Times

Rank	Authors	Total No of papers
1	Rosbash, M.	58
2	Kyriacou, Charalambos Panayiotis	23
3	Villella, Adriana	18
4	Stanewsky, Ralf	16
5	Gailey, Donald A.	14
6	Dowse, Harold B.	12
7	Taylor, Barbara Jackson	10
7	Hamblen-Coyle, Melanie J.	10
8	Wheeler, David A.	9
8	Tompkins, Laurie	9
9	Peixoto, Alexandre AfrÃ¢nio Peixoto	8
9	Hardin, Paul E.	8
9	Levine, Joel D.	8
9	Lee, Gyunghee	8
10	Kaneko, Maki	7
10	Brandes, Christian	7
10	Siegel, Richard W.	7
10	Park, Jae	7

10	Kay, Steven	7
10	Funes, Pablo	7
10	Baker, Bruce S.	7
11	Rutila, Joan E.	6
11	Zwiebel, Laurence J.	6
11	Kulkarni, Shankar J.	6
11	Konopka, Ronald J.	6
11	Plautz, Jeffrey D.	6

CONCLUSION

Jeffrey C. Hall's Publication productivity under study for 46 years (1972-2017) during which he has published 201 papers indicate that the productivity increased in decades III (1990-1999). He has published 22 single authored papers and 179 with collaboration and its collaboration coefficient was 0.89. His highly cited paper was *"A pdf neuropeptide gene mutation and ablation of PDF neurons each cause severe abnormalities of behavioral circadian rhythms in Drosophila"* published in 'Cell' journal in 1999 has received citation 632, maximum citation received (1026) year was 2002 in a year, he has published his papers in more than 50 renowned journals which have high impact factor, and he has published 240 papers in collaboration. M. Rosbash who is found to be the most productive collaborator of Jeffrey C. Hall.

REFERENCES

1. Angadi, M.; Koganuramath, M.M.; Kademani, B.S.; Kumbar, B.D. & Jange, S. Nobel Laureate Anthony J Leggett : A scientometric portrait. *Annals of Library and Information Studies.*, 2006, 53(4) 203–212. http://nopr.niscair.res.in/bitstream/123456789/6027/1/ALIS%2053%284%29%20203-212.pdf (accessed on 10 December 2017)
2. Barik, N. & Jena, P. Scientometric Portrait of Dr . Amartya Kumar Sen , The Nobel Laureate & Bharat Ratna. *KIIT Journal of Library and Information Management.,* 2016, 3(2), 109-116. http://eprints.rclis.org/31116/1/Scientometric%20Portrait%20of%20Dr.%20Amartya%20Kumar%20Sen%2C%20The%20Nobel%20Laureate%20and%20Bharat%20Ratna.pdf (accessed on 22 December 2017)
3. Dixit, G. P. & Jange, S. Scientometric portrait of Prof. S Sreenivasa Murthy. International Journal of Research in Library Science., 2017, 3(1), 24-35.

http://www.ijrls.in/wp-content/uploads/2017/03/Scientometric-Portrait-of-Prof.-S-Sreenivasa-Murthy.pdf (accessed on 20 December 2017)

4. Kademani, B. S.; Kalyane, V. L. & Kumar, V. Scientometric portrait of Nobel Laureate Harold W. Kroto. *SRELS Journal of Information Management.*, 2002, 39(4), 409-434. http://eprints.rclis.org/4830/1/K-82.pdf (accessed on 10 November 2017)
5. Kalyane, V. L.& Kalyane, S.V. Scientometric portrait of Vinodini Reddy. *Journal of Information Sciences*., 1993, 4(1), 25-45. http://eprints.rclis.org/4786/ (accessed on 1 November 2017)
6. Kalyane, V.L& Kalyane, S.V.Scientometric portrait of MS Swaminathan, *Library Science*.,1994, 31(1), 31-16.http://eprints.rclis.org/4785/1/K-28.pdf(accessed on 6 November 2017)
7. Kalyane, V.L. & Sen, V.K. Scientometric portrait of Nobel Laureate Pierre-Gilles De Gennes.Malaysian Journal of Library & Information Science., 1996, 1(2),13-26. http://ejum.fsktm.um.edu.my/article/213.pdf (accessed on 15 December 2017)
8. Gadad, R.& Ravi, B. Nobel Laureate Prof. Paul Greengard: A scientometric portrait. *International Journal of Academic Library and Information Science*.,*2016,*4(1), 42-50. http://www.academicresearchjournals.org/IJALIS/PDF/2016/January/Ravi%20and%20Gadad.pdf (accessed on 10 November 2017)
9. Hazarika, T, Sarma, D.& Sen, B. Scientometric portrait of Nayana Nanda Borthakur: a biometeorologist. *Annals of Library and Information Studies.*, 2010, 57(1), 21–32. http://nopr.niscair.res.in/bitstream/123456789/8282/4/ALIS%2057%281%29%2021-32.pdf (accessed on 15 November 2017)
10. Kademani, B.S.; Sagar, A. & Vijai, K. Scientometric portrait of Homi Jehangir Bhabha: the father of Indian nuclear research programme. Scientific Information Resource Division, Knowledge Management Group, Bhabha Atomic Research Centre, Mumbai, 2009.
    http://eprints.rclis.org/14064/1/Scientometric_Portrait_of_H._J._Bhabha.pdf
    (accessed on 2 December 2017)
11. Koganuramath, M.M., Angadi, M.; Kademani, B.S.; Kalyane, V.L. & Jange, S. Physics Nobel Laureate Wolfgang Ketterle: A scientometric portrait. *Malaysian Journal of Library and Information Science.*,2004,9(2), 35–61. http://eprints.rclis.org/4637/1/Ketterle-Wolfgang.pdf (accessed on 4 November 2017)
12. Munnolli, S.S , Pujar, S.M & Kademani, B.S. Scientometric portrait of Nobel Laureate Harald Zur Hausen. *Annals of Library and Information Studies.*,2011, 58(1), 71–

78.http://nopr.niscair.res.in/bitstream/123456789/11560/3/ALIS%2058%281%29%2071-78.pdf (accessed on 10 November 2017)

13. Qayyum, M. & Naseer, M.M. Bio-biblometric study of Dr. Khalid Mahmood's contribution to LIS field in Pakistan. Library Philosophy and Practise (e-journal)., April 2013. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?referer=https://www.google.co.in/&httpsredir=1&article=2154&context=libphilprac (accessed on 20 December)
14. Sen, S.K. & Gan, S.K. Biobibliometrics: Concept and application in the study of productivity of scientists. *International Forum on Information and Documentation.*, 1990, 15(3), 13-21.
15. Sinha, A.K. Scientometric study of books authored by nobel laureate amartya sen. *Annals of Library and Information Studies.*,2017, 64(1), 9-15.http://nopr.niscair.res.in/bitstream/123456789/41539/1/ALIS%2064%281%29%209-15.pdf (accessed on 2 november 2017)
16. Vellaichamy, A.&Amsan, E. Scientometric portrait of Mike Thelwall. *Library Philosophy and Practice (e-journal).*, 2006, Winter.https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=4203&context=libphilprac (accessed on 4 December 2017)
17. Wilson, C.S. Informetrics. InAnnual Review of Information Science and Technology, edited by M.E. Williams. Information Today, Inc. for the American Society for InformationScience,Medford, NJ, 2001, 3–143. http://www.mastervti.fr/web/IMG/pdf/The_Literature_of_Bibliometrics_Scientometrics_and_Informetrics-2.pdf (accessed on 12 December 2017)

WEB RESOURCES

1. Britannica https://www.britannica.com/biography/Jeffrey-C-Hall (accessed on 15 December 2017)

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